

Atty. Dkt. No. 033995/0110

Roderic M.K. DALE, *et al.*  
Serial No. 09/223,957

**Rejection Under 35 U.S.C. § 103**

The Examiner rejected claims 1-4 and 6-20 as being obvious under 35 U.S.C. § 103 over Applicants' own prior art admissions on the record at page 2, first paragraph; page 12, lines 1-14; and page 14, last paragraph. Applicants respectfully request reconsideration and withdrawal of the rejection.

In an Interview Summary summarizing an interview of December 4, 1999, the Examiner stated the following:

The examiner indicated that an advisory action would be forthcoming wherein the obviousness rejection has been maintained because there is no data showing unexpected results using the now claim[ed] hydrophobic polymers versus the SepPak C18 material in the desalting and concentrating of nucleic acids. Ms. DeVoe indicated that the applicants would provide just such data to overcome the outstanding rejection.

In an Interview Summary summarizing an interview of July 28, 2000, the Examiner stated the following:

Declaration was submitted in response to a request by Examiner Kunz in an interview dated December 4, 1999. The declaration was sufficient in presenting evidence to overcome the rejection of record.

Attached herewith, please find a copy of a Declaration by Steven L. Gatton which was submitted to the Examiner in the interview of July 28, 2000. The declaration provides experimental data obtained from experiments which involved desalting and concentrating nucleic acids using the hydrophobic base matrix of the present invention (PRP-1) and Waters Prep C18. Improved and unexpected results including pH range of use, increased capacity and decreased leaching during the wash step are observed for PRP-1 as compared to the C18 columns. The improved and unexpected results overcome the Examiner's rejection of claims 1-4 and 6-21 as being obvious over Applicants' own prior art admissions on the record at page 2, first paragraph; page 12, lines 1-14; and page 14, last paragraph.

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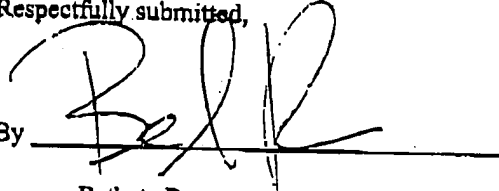
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Serial No. 09/223,957**CONCLUSION**

As the above-presented amendments and remarks address and overcome all of the rejections presented by the Examiner, withdrawal of the rejections and allowance of the claims are respectfully requested.

If the Examiner has any questions concerning this application, he or she is requested to contact the undersigned.

Respectfully submitted,

By



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Date August 29, 2001

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Should additional fees be necessary in connection with the filing of this paper, or a petition for extension of time is required for timely acceptance of same, the Commissioner is hereby authorized to charge Deposit Account No. 19-0741 for any such fees, and applicant is hereby petition for any needed extension of time.

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**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

**Applicant:** Roderic M.K. DALE, *et al*  
**Title:** METHOD FOR NUCLEIC ACID PREPARATION  
**Appl. No.:** 09/223,957  
**Filing Date:** December 31, 1998  
**Examiner:** H. Owens  
**Art Unit:** 1623

**DECLARATION OF STEVEN L. GATTON**  
**UNDER 37 C.F.R. § 1.132**

Dear Sir:

1. I, STEVEN L. GATTON, declare and say I am a resident of Lake Oswego, Oregon. My address is 18990 SW Pilkington Road, Lake Oswego, Oregon 97035-8130 U.S.A.
2. I hold a Bachelor degree in chemistry which I received from Muakungum College in May, 1976. I further hold an M.S. in chemistry which I received from Bowling Green State University in June, 1982. I am currently employed in the position of Director, Quality Assurance, and Safety/Chemical Hygiene Officer at the company Oligos Etc., Inc., 9775 SW Commerce Circle, Building C6 Wilsonville, Oregon 97070-0727. I am an expert in the fields of nucleic acid chemistry and oligonucleotide production and purification.
3. I am an inventor of the claims of the above-identified patent application. I directed others and personally performed the research leading to the invention disclosed and claimed therein.
4. I have read the Final Office Action dated August 17, 1999.
5. The following provides the evidence requested by the Examiner.

**Summary of Hamilton PRP-1 vs Waters Prep C18**

C18 columns and PRP-1 columns were compared for capacity limitations and efficacy in desalting and concentrating oligonucleotides following purification procedures. The columns used for this study, both C18 and PRP-1, were prepared using Millipore-Amicon Vantage 1.6 cm ID glass columns, poured to a height of 30 cm. Column volume of each column was calculated to be 60 mL.

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The following results were obtained:

- A. The Waters Prep C18 stationary phase cannot be used to load samples from an alkaline (pH 10-14) SAX purification without first being neutralized to less than pH 8. This introduces an additional step into the process which the PRP does not require. As such Examples 1 and 2 cannot be performed using the C18 phase without modifying the protocol by adding an additional neutralization step. In addition, it has been reported (Sofer et al., *Process Chromatography: A Practical Guide*, Academic Press, San Diego, California (1989), p. 93-105, copy provided for Examiner) that chromatography media that are compatible with sodium hydroxide at elevated pH are most suitable for production-scale work. This allows sanitization of the chromatography phase without the use of bacteriostatic additives. High pH (13-14) is also capable of removing endotoxins from chromatography media. Since this is within the PrP-1 working pH range and well outside that of the Prep C18, the PRP has a clear advantage over the Prep C18 for large-scale processes used for drug manufacture.
- B. The pH range of the Waters Prep C18 phase as determined by the manufacturer not only does not permit the direct use of alkaline pH during loading, but it also precludes use of the C18 phase in acidification of acid-resistant oligonucleotides as demonstrated in Example 3. The pH of the acidifying solution is 1.5, which is below the lower limit of pH 3 of the C18. In addition, the typical loading range of oligonucleotide onto the PRP increases over 3-fold when performed at pH 1-2 rather than at pH 7. As written, Example 3 cannot be done on the Waters Prep C18 without sustaining damage to the phase. Example 3 is quite simple to perform using PRP phase.
- C. The Waters Prep C18 phase leaches absorbed oligonucleotide during the wash that is intended to remove residual salt from the SAX purification. This makes the determination as to when the salt has been removed problematic. The PRP cleanly holds its absorbed material, and allows the column to be washed to very low levels of conductivity without loss of material. This feature makes the PRP much easier for the operator and/or automated equipment to assess the endpoint of the washing process and to start the elution.
- D. The Waters Prep C18 is not compatible with the water-ethanol solvent system as practiced in all Examples of the application. The packing of the C18 columns used in this study cracked and channeled very badly during the elution. As a result, the columns required repacking before subsequent use. This problem has not been observed with the PRP, and columns have used for dozens of procedures without repacking.

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E. Finally, the PRP column was able to retain a capacity of 4788 A<sub>260</sub> for a 40-mer, compared to only 2880 A<sub>260</sub> for a 40-mer with the C18 column. Thus the PRP column had a capacity 60% greater than the C18 column of approximately the same size and volume. This is a significant advantage in large scale production of oligonucleotides, as the fewer and/or smaller PRP columns would be required to desalt and concentrate synthesized oligonucleotides in large-scale preparations.

To summarize these results, the side-by-side comparison of the two columns are as follows:

<u>stationary phase</u>	<u>Acid resistant</u>	<u>Base resistant</u>	<u>Operating pH Range</u>	<u>Capacity of 40-mer</u>	<u>Leaching during wash</u>
PRP-1	Yes	Yes	0-14	4788 A <sub>260</sub>	No
C18	No	No	3-8	2880 A <sub>260</sub>	Yes

Thus, the PRP columns provide improved and unexpected results as exhibited by results including 1) improved pH range of use; 2) increased capacity; and 3) decreased leaching during the wash step as compared to the C18 columns.

6. I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title XVIII of the United States Code, and that such will false statements may jeopardize the validity of the application or any patent issuing thereon.

Date

8/23/2001

  
Steven L. Garton